Overview

This technical appendix companies the DMV Monitor, a set of analyses leveraging public and private data sources to track economic and social trends in the Washington–Arlington–Alexandria, DC–VA–MD–WV metropolitan area. Version 1.1 of the DMV Monitor (released on September 24th, 2025) covers the following indicators of economic and social wellbeing for individuals, workers, and households within the 23-county metropolitan area:

Overall economy	**Jobs** Source: Lightcast and U.S. Bureau of Labor Statistics	Total nonfarm payroll jobs, measured at location of employment
	Commercial bankruptcy rate Source: Administrative Office of the United States Courts	Business bankruptcy cases filed per 100,000 people
	Federal obligations Source: USASpending	Legally-binding funds committed to recipients through federally-awarded grants, contracts, loans, and cooperative agreements
Labor Market & Workforce	**Consumer prices** Source: U.S. Bureau of Labor Statistics	Indexed change in the price of a fixed basket of goods for urban consumers, indexed to 1984 levels
	Unemployment rate Source: Lightcast and U.S. Bureau of Labor Statistics	Percentage of labor force not currently employed
	Job postings Source: Lightcast	Total number of online job advertisements posted by employers, deduplicated for cross-posted listings
	Mass layoff notifications Source: WarnTracker.com	Notifications for closures or layoffs by qualified employers under the Worker Adjustment and Retraining Notification Act
Innovation	**Academic research funding to universities** Source: USASpending	Federal obligations to institutions of higher education made for research-based grants, contracts, loans, and cooperative agreements
	Utility patents Source: United States Patent and Trademark Office	Filed and granted applications for patents covering new inventions
	Venture capital Source: Crunchbase	Capital investment in startup firms through seed rounds, individual "angel" contributions, or convertible notes
Real Estate & Housing	**Commercial occupancy rate** Source: CoStar	Share of total square footage zoned as office or retail space that is currently occupied
	Active residential for-sale listings Source: Realtor.com® Economic Research	Number of for-sale residential listings on the market in a given month, excluding those pending sale
	Median residential listing price Source: Realtor.com® Economic Research	Median price of for-sale residential listings on the market in a given month
Destination & Travel	**Hotel revenue per available room** Source: CoStar	Hotel revenue generated by available rooms/units over a given period, whether or not they are occupied
	Total air passengers served Source: U.S. Bureau of Transportation Statistics	Total passengers enplaned and deplaned on scheduled services at airports in a given market, excluding connecting flights
Municipal Services	**Transit ridership** Source: U.S. Federal Transit Administration	Total number of passengers traveling on public transportation vehicles, including buses, trains, and ferries
	Crime rate Source: Federal Bureau of Investigation	Number of major criminal incidents reported per 100,000 people
Household Wellbeing	**Personal bankruptcy rate** Source: Administrative Office of the United States Courts	Non-business bankruptcy cases filed per 100,000 people
	Credit-constrained population rate Source: Federal Reserve Bank	Share of consumers with an Equifax risk score below 660
	Medicaid/CHIP enrollment Source: State agency reporting	Total number of individuals enrolled in state-offered Medicaid and Children's Health Insurance Program (CHIP) services
	SNAP participation Source: State agency reporting	Total number of individuals participating in state-offered Supplemental Nutrition Assistance Program (SNAP) services

I. Overall Economy

Jobs

The primary source of jobs data for the DMV Monitor is the Current Establishment Survey (CES), published monthly by the Bureau of Labor Statistics (BLS) for the nation, all fifty states and the District of Columbia, major U.S. metropolitan areas, and select subdivisions within those metropolitan areas ("metropolitan divisions"). The Bureau of Labor Statistics collects data for the CES through a payroll survey of more than 121,000 employers spanning 631,000 worksites each month, and routinely adjusts these estimates to better account for seasonality and benchmark against the agency's Quarterly Census of Employment and Wages (a more comprehensive but significantly less timely measure of employment based on state unemployment insurance records). Jobs data in version 1.1 of the DMV Monitor represents CES data released in August 2025 and is subject to change in future releases based on BLS revisions.

While the CES provides some estimates for industry employment at the state and regional level, suppression by BLS makes data for certain industries incomparable across geographies and time periods. We standardize these industry estimates using monthly data from Lightcast, which employs a proprietary unsuppression methodology to develop estimates of employment at high degrees of industry and geographic granularity. Through this standardization procedure, missing and suppressed sector-level values are imputed based on Lightcast's estimates of employment and normalized to BLS-reported "supersector" totals. This procedure allows us to identify cross-regional trends in private sector industry growth without jeopardizing any of the high-level estimates for total, private sector, and federal employment contained in the CES (which are not suppressed for any state or very large metropolitan area, and are thus not subject to the standardization procedure described above).

Beyond its role in this standardization procedure, Lightcast's employment data further allows us to calculate small-area monthly estimates of employment for counties and independent cities within the Washington metropolitan area. Our procedure for developing these small-area estimates is as follows:

- Monthly estimates of industry employment for each county are first normalized to the CES-reported totals for the metropolitan division to which that county belongs[1].
- For each metropolitan division and industry grouping, we construct a time series for employment estimates starting in January 2001, calculating month-to-month changes across the time series.
- For months where no county-level estimates from Lightcast are yet available (January 2025 onward, as of DMV Monitor Version 1.1), job totals are imputed based on the historical relationships between division-level industry growth factors and county-level level growth factors, constraining estimates based on the known division-level totals in each period.

Following all standardization procedures and small-area estimations, all data were grouped by industry and geography and seasonally adjusted using the X13-ARIMA-SEATS method developed and maintained by the U.S. Census Bureau. While this is the same method employed by the BLS in the development of their official seasonally-adjusted data products, differences in certain model parameters (including trading days and outlier detection) results in values that differ slightly from official BLS estimates for seasonally-adjusted employment; however, these differences are often minute and do not result in substantially different growth trajectories or employment totals for any grouping. We run this seasonal adjustment even on series where official seasonally-adjusted data from BLS is available to ensure consistency and comparability across industries and geographies.

The resulting product of these steps is a comprehensive dataset of monthly, industry-level employment from January 2001 onward for the nation, all very large metropolitan areas, and each of the Washington metro's areas

[1] The Office of Management and Budget (OMB) delineates three metropolitan divisions within the greater Washington metropolitan area, in which the District of Columbia is considered a constituent county of the Washington, DC-MD division (along with Prince George's County, MD and Charles County, MD). Because the District of Columbia is reported separately as a state-equivalent geography in the CES, it is removed from the normalization procedure for the Washington, DC-MD division.

23 constituent counties. It is critical to note that by nature, CES data is reflective of the total employees on active payroll in a given month, and does not account for whether these jobs are full-time or part-time, or whether they are held by individuals that work in more than one job (and are therefore counted more than once). Agricultural workers, self-employed workers and self-proprietors, unpaid family workers, and workers on unpaid leave or on strike during the survey period are also not counted in the CES. For these reasons, while CES data can be used in conjunction with other labor market data like the Quarterly Census of Employment and Wages and the Current Population Survey, estimates of employment are not directly comparable across these data products and should be interpreted accordingly.

Commercial bankruptcy rate

Data on local commercial bankruptcy is provided by the U.S. Court System through Table F-5A: Business and Nonbusiness Cases Filed. This quarterly report covers the 12-month rolling period ending on the final day of each reference quarter, and provides detailed counts of bankruptcy filings by the court district overseeing each case, the home county of the individual or business filing for bankruptcy, and chapter of the federal bankruptcy code. To preserve comparability across geographies and time, the DMV Monitor excludes bankruptcies filed outside of the filer's county of residence, and all bankruptcy totals are evaluated as a population rate (per 100,000 people).

Federal obligations

The DMV monitor tracks federal obligations using data from USASpending, the federal government's authoritative resource for information on federal expenditures and award activity. All federal agencies are required to report funding awarded to external organizations, governments, businesses, and individuals to USASpending each month, which is in turn published for targeted querying and/or bulk download.

As part of this database, USASpending provides two fields for location-based analysis: recipient location (determined by the primary awardee's mailing address) and primary place of performance (determined by other award-specific data). Because place-of-performance data has been identified by the U.S. Government Accountability Office (GAO) as one of the fields in USASpending most subject to reporting gaps and inaccuracies, our analysis of federal obligations for the DMV Monitor utilizes *recipient location* to compare federal funding flows across counties and regions. Filtering on this award parameter, we utilize USASpending's application processing interface (API) to aggregate monthly obligation totals for all U.S. counties, with detailed breakdowns by funding type: grants, contracts, cooperative agreements, and loans. As part of this query, awards are sorted by month based on the initial obligation date, representing the base period in which the federal government formally committed to paying out funding to the recipient organization (note: funds are often paid out through several transactions spanning months or years following the base obligation date, and funds can be de-obligated from recipients in limited circumstances).

Following this query to the USASpending API, we convert raw obligation totals for each month into twelve-month rolling totals for each month, county, and funding vehicle, a common practice for identifying time trends in data with high degrees of short-term volatility. Because USASpending aggregates upward from daily award data, single-day differences in an award date can create significant noise in monthly aggregations, particularly in smaller geographies. The conversion of this metric to a rolling total ensures that these short-term variances do not obscure long-term data trends.

Consumer prices

To measure changes in consumer prices across the Greater Washington metro area, we use data from the Consumer Price Index (CPI), published by the BLS for a set basket of consumer goods (anchored to 1984 U.S. dollars). Because metro-level data is published on a bi-monthly basis, we interpolate missing months based on relative month-to-month shifts in the national CPI. For more information about the basket of goods tracked in the CPI, see https://www.bls.gov/cpi/.

II. Labor Market & Workforce

Unemployment rate

Data on local and regional unemployment rates are provided by Lightcast, which aggregates data directly from the BLS via their monthly Local Area Unemployment Statistics (LAUS) report. Because these estimates are not seasonally adjusted by BLS, we apply the same X13-ARIMA-SEATS adjustment described on Page 2 of this appendix to all employment, labor force, and unemployment totals, then convert to a three-month running average to normalize trend data for small jurisdictions. The final unemployment rate for every month and county/metro area is then calculated as the total number of persons aged 16 or older in a given jurisdiction that do not actively hold a job but have either a) actively sought employment in the four weeks leading up to the survey period, or b) are awaiting recall to a job from which they have been temporarily laid off, as a share of the total civilian labor force[2]. Note that unlike other employment data from BLS, LAUS records employment and unemployment based on each respondent's place of residence, not place of work, and individuals are counted once regardless of whether they hold more than one job. For more information on the differences between BLS data products and definitions, see https://www.bls.gov.

Job postings

Job postings data used in the DMV Monitor is provided by Lightcast, and reflects a database of online listings posted on online job boards and company websites. Lightcast normalizes data for position titles, company names, and locations to identify and deduplicate cross-posted listings. For more information, visit https://kb.lightcast.io.

Mass layoff notifications

Version 1.1 of the DMV Monitor aggregates data from WARNTracker.com, which collects and harmonizes data from WARN notices from nearly every U.S. state dating back more than 25 years. As required by the Worker Adjustment and Retraining Notification (WARN) Act of 1988, these data allow us to estimate the total number of employees[3] at eligible employers[4] ahead of a mass layoff event or plant closure. Except in certain unforeseen circumstances (including but not limited to natural disasters), federal law requires the issuance of a layoff notification at least 60 days in advance of temporary workplace closures impacting at least fifty employees, or layoff events impacting either a) 500 employees at a single site, or b) at least fifty employees constituting 1/3rd of the site's total workforce; however, certain states impose more stringent requirements for layoff notifications. Federal agencies are typically exempt from WARN reporting; however, notices may be issued for quasi-public entities operating in a commercial context (such as the National Institutes of Health), or where public sector reporting is required by state law.

Using data collected from WARNTracker.com, we match all impacted worksites with a valid address or location description (such as postal codes and city/state names) and crosswalk those worksites with valid locations from GeoNames.org, a geographical database containing millions of standardized names and coordinates for cities, neighborhoods, and points of interest. Using coordinates attached to these locations, we subsequently match all worksites with valid location data to counties using TIGER/Line cartographic shapefiles from the U.S. Census Bureau. Data is then aggregated by county/metro area and month in which each layoff notification was issued.

Because of the limited circumstances in which WARN notices are issued, subnational monthly data is highly volatile, and best suited for understanding large-scale worker displacement events at discrete points in time. To better

[2] Includes noninstitutionalized military individuals aged 16 or older that are either employed or unemployed. Individuals are not counted in the labor force if they are under the age of 16, institutionalized, or are neither employed nor actively seeking a job.

[3] Includes employees that work at least 20 hours per week and have been employed at the impacted firms for at least half a year leading up to the reported mass layoff event or plant closure.

[4] Includes firms with at least 100 employees that either work more than twenty hours per week OR where employee hours per week add up to 4,000 or more, excluding overtime.

understand trends in these events at a subnational scale, the DMV Monitor presents all data as a rolling twelve-month aggregated total.

III. Innovation

Academic research funding to universities

The DMV monitor tracks academic research funding to universities using data from USASpending, filtering awards, contracts, loans, and cooperative agreements to contain only those issued to institutions of higher education tagged with a "research" keyword. For more information about how data is collected from USASpending for the DMV Monitor, see "federal obligations" on Page 3.

Utility patents

The DMV Monitor aggregates patent data using information provided by the U.S. Patent and Trademark Office through their PatentsView portal, which provides streamlined, disambiguated data for granted patents and pre-grant patent applications. Using the same geocoding methodology used for mass layoff notifications on Page 4, we attach geographic data to all patent records based on the listed home address of the first named inventor for each patent.

As with other metrics based on individual records recorded at discrete points in time, patent data is subject to high month-to-month volatility. Therefore, all aggregated patent data is aggregated as a twelve-month rolling total.

Venture Capital

Venture capital data in the DMV Monitor is acquired from Crunchbase, a digital provider that uses both public and private data to collect and aggregate information on startup activity and investment flows. All investment totals are aggregated based on the location of the companies receiving funding, and presented as a twelve-month rolling total to counter month-to-mount volatility. For more information, see https://about.crunchbase.com/.

IV. Real Estate & Housing

Commercial occupancy rate

Occupancy of commercial real estate is provided by CoStar, the leading source of private real estate data in the United States. Aggregating data from millions of properties across the United States, CoStar provides county-level square footage totals for office- and retail-zoned commercial space and calculates the share of total square feet actively leased and occupied by tenants and owners as a share of that county's total available inventory. For more information about CoStar's market analytics, see https://www.costar.com/products/market-analytics.

Active residential for-sale listings / Median residential listing price

Data on for-sale residential listing volumes and prices are provided by Realtor.com® Economic Research, which provides aggregated statistics for select U.S. states, metro areas, counties, and ZIP codes based on their database of MLS-listed for-sale properties. For more information on Realtor.com's housing data, please visit https://www.realtor.com/research/data/.

V. Destination & Travel

Hotel revenue per available room

Hotel revenue and occupancy data is provided by CoStar, which aggregates and publishes data hotel data as part of their broad suite of commercial real estate analytics. Hotel revenue per available room – calculated as the product

of the region's average daily room rate (ADR) and its occupancy rate over a given period – is a common metric used by destination marketing organizations to measure the health of tourism and visitation across regions. For more information, see https://www.costar.com/products/market-analytics.

Total air passengers served

Air travel data used in the DMV Monitor is aggregated from the U.S. Bureau of Transportation Statistics (BTS) as part of their T-100 Market database for all air carriers operating scheduled services in the United States. Through this air market data, we calculate the total number of passengers enplaning (boarding) or deplaning at the origin and destination points of their scheduled trips, and aggregate by to the county- and metro-level based on the reported latitude and longitude coordinates of each airport. By doing so, we account for the total volume origin-destination passenger travel at U.S. airports, while controlling for connecting passenger traffic. For more information about the T-100 Market database, see https://www.transtats.bts.gov.

VI. Municipal Services

Transit ridership

Data on transit ridership is aggregated from the Federal Transit Administration's (FTA) National Transit Database (NTD), a comprehensive dataset of passenger volume, service frequency, and financial and operating conditions of publicly-serviced transit systems across the United States. Using data from the NTD, we aggregate values for vehicle revenue miles – defined as the total service miles traveled by a bus, train, ferry, or other transit vehicle while carrying passengers – for each transit hub, then crosswalk each transit hub to its relative census urban area. Because census urban areas can span more than one county, we allocate these revenue miles across counties using population weighting, then aggregate to the metro-level. All values for vehicle revenue miles are converted to rates per 100 unlinked passenger trips and presented as a three-month rolling total, to account for seasonality in passenger volumes that obfuscate time trends in smaller transit markets. For more information, see https://www.transit.dot.gov/ntd.

Crime

Data on local and regional crime rates are compiled using the Federal Bureau of Investigation's (FBI) Crime Data Explorer, which presents monthly agency-level crime statistics provided through the agency's Uniform Crime Reporting (UCR) program. Through the UCR, local law enforcement agencies provide the FBI with total incident reports across major crime categories, including:

- Violent offenses: aggravated assault, homicide, rape, and robbery
- Property offenses: arson, burglary, larceny-theft, and motor vehicle theft

For each of the above offenses, we tally the total number of reported incidents over a given month across all reporting jurisdictions and law enforcement agencies, then crosswalk each agency to its corresponding county and aggregate to the county- and metro-level. Crime statistics in the DMV Monitor are presented as totals for all major offenses, violent offenses, and property offenses, converted to rates per 100,000 people based on the participating population reported by each agency in a given month. For more information, visit https://cde.ucr.cjis.gov/.

Note that for all publicly-available crime statistics, the FBI advises significant caution when ranking or comparing jurisdictions or agencies to one another. This is because while the UCR attempts to standardize crime reporting data across geographies and time, different agencies may still follow individualized practices for policing and reporting. Additionally, crime levels and rates across agencies, counties, and metro areas are often the product of several social, economic, and political factors that cannot be captured in point-in-time crime statistics. As such, crime data in the DMV Monitor should be interpreted with appropriate caution, and individual jurisdictions should

be primarily benchmarked against themselves based on their own time trends, rather than compared to other jurisdictions.

VII. Household wellbeing

Personal bankruptcy rate

Like data for commercial bankruptcy rate, data for personal bankruptcies is derived from Table F-5A: Business and Nonbusiness Cases Filed from the U.S. Court System, reported quarterly on a 12-month rolling basis and presented as a population rate (per 100,000 people). For more information, see https://www.uscourts.gov/statistical-reports.

Credit-constrained population rate

The source of our data on credit-constrained consumers is the Federal Reserve Bank of New York's Consumer Credit Panel, which is run quarterly with Equifax to measure household debt and credit levels across U.S. states, metro areas, and select counties.

For metro areas, we calculate the share of credit-constrained consumers using data from this dataset presented by the Federal Reserve Bank of Philadelphia through their Consumer Credit Explorer. In this analysis, we define "credit-constrained consumers" as those with credit scores under 660, segregated to differentiate between those with near-prime credit (600-659) and subprime credit (below 600). Through this dataset, we can access both shares of the consumer population for each metro area, state, and non-metropolitan portion for each state, as well as the total survey sample size for each region, which allows us to aggregate our estimates to obtain a very large metropolitan average.

While the Consumer Credit Explorer does not report on total credit-constrained shared at the county-level, the Federal Reserve Bank of St. Louis does report county-level shares for subprime credit through their Federal Reserve Economic Data (FRED) tool. By linking these two data sources together, we estimate the share of near-prime credit consumers in each county by population-weighting all metro-level totals and then raking the data to create county-level estimates that sum to the total near-prime credit population in each metro area, state, and non-metropolitan portion. This raking procedure allows us to derive sub-metro estimates for both near-prime and sub-prime credit populations.

Medicaid/CHIP enrollment and SNAP participation

Unlike the above data metrics, data for SNAP and Medicaid are not collected by any single data source at the sub-state level. Instead, data for the Washington metropolitan area and its constituent counties are aggregated from the following data sources:

- Medicaid:
  - District of Columbia: Monthly Medicaid & CHIP Enrollment Reports & Data
  - Maryland: The Hilltop Institute at UMBC's Maryland Medicaid DataPort
  - Virginia: Medicaid / FAMIS / PACE Enrollment Reports
- SNAP:
  - District of Columbia: Food and Nutrition Service SNAP Data Tables
  - Maryland: DHS Temporary Cash Assistance Reports
  - Virginia: DSS SNAP Participation Reports

All data is subject to state-by-state differences in reporting methodologies. Because of limited data availability, data for Jefferson County, WV is not included in estimated enrollment totals for the Washington metropolitan area.